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JAN 16 1992

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT 155716

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5. Proj./Prog./Dept./Div.:	6. Cog. Engr.:	7. Purchase Order No.:
N/A	G. J. Carter	N/A
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15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Impact Level	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	WHC-SD-LL-PLN-001	--	0	2724-W LAUNDRY WASTEWATER SAMPLING & ANALYSIS PLAN DRAFT	3	4		

16. KEY

Impact Level (F)	Reason for Transmittal (G)	Disposition (H) & (I)
1, 2, 3, or 4 (see MRP 5.43)	1. Approval 4. Review 2. Release 5. Post-Review 3. Information 6. Dist. (Receipt Acknow. Required)	1. Approved 4. Reviewed no/comment 2. Approved w/comment 5. Reviewed w/comment 3. Disapproved w/comment 6. Receipt acknowledged

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SUPPORTING DOCUMENT

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2724-W LAUNDRY WASTEWATER SAMPLING & ANALYSIS PLAN	WHC-SD-LL-PLN-001	0

5. Key Words

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6. Author

Name: G. J. Carter, G. H. Lavey

Signature

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7. Abstract

This sampling and analysis plan (SAP) establishes the guidelines for providing confirmatory data to support nondangerous wastestream proposed designation. The plan establishes the level of monitoring required to confirm that the stream characteristics do not change until it is discontinued in 1995.

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CONTENTS

C. STREAM HISTORY

The stream history was reviewed to evaluate the sample frequency. The laundry wastewater is the combination of effluents from many simultaneous activities that blend for an overall consistent water quality. As expected with a large number of small customers, the limited daily wash volume from each customer is insufficient to produce a noticeable change in the overall process.

A foundation of the historic daily samples taken from the sump and composited monthly for pH, total organic carbon (TOC), and radionuclides supports this observation. Although these were manual grab samples taken upstream of the lint filters, the sample results were representative of the more recent studies discussed below.

The laundry wastewater analyses have been accomplished to support best available technology (BAT) documents and a Stream-Specific Report as follows:

- In 1989 a BAT (WHC 1991b) was performed to support a new laundry facility design
- In 1990 a Stream-Specific Report (WHC 1990b) was generated to identify a wastewater designation
- In 1991 a BAT revision was required to update the wastewater characterization information and to address new discharge requirements using treatability studies.

To support the new laundry facility, recent treatability studies were performed on typical and worst case wastewater scenarios. The objective was to characterize the stream better and to identify various treatment technology performance data over the range of effluent qualities. The treatment goal was to meet the acceptance criteria for the Treated Effluent Discharge Facility (TEDF) W-049H.

These treatability test results were validated and were consistent with the historic radionuclide data. Specifically, the controlled typical and worst-case wash water compared favorably with historic data. In addition, these tests results compared as expected with previous wastewater stream-specific characterization analyses.

The recent studies of the filtration performance show that particulate filtration removes radioactive contamination. However, significant removal of these particles require filtration to less than one-half micron. Ion exchange did improve the removal efficiency. To make the treatment cost effective, a BAT document has been drafted and is in the review and approval cycle.

Consequently, point source sampling at the various machines provides information about discharges from a particular machine but does not characterize the composition of routine laundry wastewater adequately. For this reason, samples will be taken at manhole A, which provides a representative sample for the entire laundry wastewater.

D. STREAM FUTURE

This stream will be eliminated in 1995 when the new replacement laundry facility in the 200-East Area (Project B-503, Decontamination Laundry Facility) begins to operate. To prevent lint from plugging the 216-W-LC laundry crib, the Project B-697, Laundry Effluent Treatment, system was designed and constructed. Final installation is scheduled for January 1992. Justification for this system based on the need to help extend the life of the 216-W-LC Crib rather than to meet environmental requirements.

The system will provide: back-up particulate filtration (vibratory filter), oil and grease removal (pressure precoat filter), sampler, and flow meter with strip chart. Although a new flow meter has been installed in manhole A, it will not operate until the project is complete. A 6,000-gal equalization tank will be used downstream of the sump to offset sump pump cycling because the pressure precoat filter requires constant effluent flow.

Fewer organic chemicals and suspended solids over 20 microns are expected in the future filtered wastewater because of the pressure precoat filter operation. However, significant radionuclide filtration is not expected due to contamination particle sizes of less than 1 micron, which were discovered in the treatability tests. Although the filter discharge will be immediately upstream of the sample point, it is not the sampling plan's objective to demonstrate the effectiveness of the filter.

E. 216-W-LC CRIB DESCRIPTION

The 216-W-LC Crib is not regulated under WAC 173-303 (WAC 1989). The crib was constructed in 1981 in two separate sections with butterfly valves to allow diversion from one section to the other. These valves were removed later and replaced with a manhole. The bottom of each section consists of six trenches. Each trench is 150 ft long, 8 ft wide, and 4 ft deep and has a side slope of 1 1/2 :1. The waste is discharged to the crib through a 4-in. perforated pipe located in the center of each trench. The trench is backfilled with 1/2- to 1-in. gravel and covered with a polyethylene barrier. The bottom of the crib is about 20 ft below grade.

Before the crib was used, the liquid effluent from the 2724-W Laundry was discharged to the soil column via U-Pond via the U-14 Ditch. Since September 1982 the wastewater is discharged to the soil via the 216-W-LC Crib.

After six months of operation, the crib began having problems with water backing into the supply piping. The distribution laterals in the crib were found to be 40- to 50-percent plugged with a gelatinous sludge that blocked piping perforations, preventing distribution of the wastewater to the gravel within the crib. To reduce the organic loading, the nearby fabrication shop that drained into the wastestream at manhole B was blocked with a cement plug in 1983. Sludge was cleaned from the crib piping, and the crib has operated with a routine manual clean-out. To reduce oil and grease loadings further, the laundry quit washing shop rags and mops. Completion of Project B-697, Laundry Effluent Treatment, will provide further crib protection.

IV. RESPONSIBILITIES

The 2724-W Facility Manager is responsible for the sampling and analysis of the wastewater generated by the facility. In this regard, the facility manager (or his designee) is responsible for:

- Preparation of this SAP.
- The completion and accuracy of this SAP.
- Proper execution of the SAP.
- Designating the 2724-W wastewater with the proper waste designation.
- Overseeing the sampling activities. Specific tasks include ensuring the correct sample point is used, assisting and cooperating with the sampling team to ensure facility safety guidelines are met, assuring appropriate equipment and skilled personnel are available for sampling, and assuring all field work is done according to established procedures.
- Reporting data results and maintaining data files containing this SAP, sampling logs, wastewater flow records, analytical results, and resulting reports.
- Requesting system audits.
- Developing, initiating, and tracking corrective actions (if needed).

The Office of Sample Management is responsible for:

- Identifying the contract laboratory to perform chemical analysis for this SAP
- Monitoring the contract laboratory for quality performance
- Receiving and monitoring laboratory data packages to ensure they are complete
- Verification and validation of laboratory data packages
- Acting as an interface between the facility manager and the contract laboratory.

The RCRA/Comprehensive Environmental Response Compensation and Liability Act of 1990 (CERCLA) sampling team (Westinghouse Hanford Sampling and Mobile Laboratory) is responsible for:

- Ensuring samples are representative
- Taking adequate blanks and other quality control indicators
- Maintaining accurate and complete sampling logs
- Initiating a proper chain of custody for each sample
- Ensuring samples are packaged and shipped properly.

V. SAMPLE LOCATION AND FREQUENCY

When laundry is operating, the machines are at different points in their respective cycles. The major wastestream constituents include the laundry soap products and material removed from the clothing. As documented in the wastestream-specific reports, a diligent search of the facility was conducted for any potentially discarded chemical products. No activities that involved improper disposal of chemicals into the wastewater were found. Unlike other facilities, the laundry's effluent constituents are generated at the customer's location and cannot be tracked from the source. Administrative controls allow only cleanable items, not waste material, to be to sent to the laundry.

A. SAMPLE LOCATION

The samples will be taken from manhole A, which is the closest point to the discharge that contains all effluent from the building and represents the total stream. This is also the location of the flow meter that records the amount of discharge to the crib.

B. SAMPLE FREQUENCY

Semiannual protocol samples shall be taken because operational history does not indicate significant fluctuations. Samples will begin to be taken three months after document approval is received.

VI. SAMPLE DESIGNATION

A unique sample number shall be provided for each sample to prevent the analytical laboratory from knowing specific description of the sample. Sample labeling shall be at the direction of the laboratory receiving the sample. The labels will require the following information to be recorded by a member from the sampling team: identification of the person in charge of collecting the sample; a unique sample identification number; date and time the sample was collected; type of analysis requested; and the place the sample was collected. The unique sample number shall be obtained from the Hanford Environmental Information System (HEIS) or equivalent. In addition, each bottle shall be identified with a bar-code sticker attached to the bottle by the bottle manufacturer. The bar code shall identify the bottle lot number and individual bottle number.

VII. SAMPLING EQUIPMENT AND PROCEDURES

A. EQUIPMENT

No monitoring equipment has been used for this waste stream. All volumes are estimated. Preventative maintenance or calibration procedures for the protocol sampling equipment is not necessary. Samples will be obtained by use of a weighted bottle, dipper, or bailer apparatus as described in Volume 2, Chapter 9.0 of SW846.

B. PROCEDURES

All applicable health and safety precautions shall be taken in accordance with the *Industrial Safety Manual* (WHC 1988).

The protocol sampling procedures are being developed and are based on recommended practices found in *Test Methods for Evaluating Solid Wastes*, EPA SW846, (EPA 1986).

VIII. SAMPLE HANDLING AND ANALYSIS

A. ANALYSIS

The chemical analytical protocols to be followed to characterize the stream completely as well as containers and preservatives to be used are dictated through the analytical methods in the following table.

B. SAMPLE HANDLING

The samples shall be collected in new, commercially available, certified, precleaned glass or plastic bottles. The certification of the precleaned condition shall accompany the bottle. The analytical laboratory shall prescribe the sample volumes and number of containers, which are subject to change. All required preservatives shall be vendor supplied and added to the containers.

Each sample or sample preparation shall be labeled with the HEIS or equivalent assigned sample number. Labels shall be affixed to sample containers before routing and should be filled out at the time of sampling. The labels shall include the sample identification number and ownership belonging to Westinghouse Hanford.

A Chain-of-Custody form shall be completed when the bottle is prepared. Section XI of this plan contains further details on the custody procedures.

Once the sample is drawn, the cap shall be sealed to the container with a tamper-proof seal.

Analytes from Table A-1 of WHC-SD-WM-QAPP-011 REV 0.

Analyte	Method	Holding Time	Preserv.	Container/Volume
ICP metals	6010	6 months	HNO_3	P 1,000 ml
AA metals	7000 series	6 months	HNO_3	
Hg	7470	6 months	HNO_3	
VOA	8240	14 days	None	Gs 2x40 ml
Semi-VOA	8270	7 days[1]	None	aG 2x40 ml
PCB/Pest.	8080	7 days[1]	None	
Anions (IC) (F, Cl, NO_2, NO_3, PO_4, SO_4)	EPA 300.0	28 days[2]	None	G 500 ml
TOC	9060	28 days	H_2SO_4	aG 250 ml
TDS*	EPA 160.1	7 days	None	P 250 ml
Pesticides	8140	7 days[1]	None	aG 1,000 ml
Herbicides	8150	7 days[1]	None	aG 500 ml
Dioxins/Furans	8280	7 days[1]	None	aG 1,000 ml
Radionuclides**		6 months	HNO_3	P 4,000 ml
Total Activity (222-S Laboratory)	N/A	6 months	N/A	G or P small vial (at least 1 ml)
pH (field test)	9040			
Conductivity/Temp	9050			

Note: These sample volumes are approximate until the contracted laboratory is determined; the actual sample volume may differ from the above listed.

[1]7 d for extraction, 40 days after extraction for analysis.

[2]Nitrate/Nitrite have a 48-hour holding time. The rest of the anions have a 28-day holding time. The contracted lab will analyze this aliquot as soon as possible after receiving the sample.

*Completeness: 90 percent; precision: ±25 percent RPD; accuracy: ±25 percent.

**Additional radionuclides to Table A-1 are ^{60}Co, ^{129}I, ^{137}Cs, ^{210}Pb, ^{228}Ra, ^{235}U, ^{244}Cm, and Gross Uranium.

The sample containers shall be cleaned and radiologically surveyed. The released sample containers then shall be bagged and re-bagged. The outer bag will be taped with tamper-proof tape. The samples will be refrigerated or cooled with ice until ready to ship, when they will be placed in a cooler containing ice. The cooler shall become part of the sample packaging. A logbook containing information pertinent to the sampling shall be maintained. Entries will include the sample point, sample number, and container volume.

Sampling personnel will keep field notes which identify date, time, weather conditions, and any other relevant information from each sampling event. The minimum requirements for field notes are stated in Section 6.1 of the *Liquid Effluent Sampling Quality Assurance Project Plan* (WHC 1991a).

The samples shall be routed to an approved Westinghouse Hanford participant contractor or subcontractor laboratory for analysis consistent with SW-846 requirements (EPA 1986), including time considerations where applicable.

IX. STATISTICS

QC sample results will be reviewed against the laboratory or method specific acceptance criteria for accuracy and precision. The Office of Sample Management (OSM) will review data that does not meet this objective to determine whether the data can be used or whether corrective action should be taken. If necessary, corrective action will consist of repeating the sampling and analysis activity and documented with a nonconformance report according to WHC-CM-4-2, procedure QI 15.1 (WHC 1988).

Specific data quality objectives and data assessment procedures are stated in the *Liquid Effluent Sampling Quality Assurance Project Plan* (WHC 1991a).

X. QUALITY CONTROL

Internal quality control requirements are specified in Section 10.0 of the Liquid Effluent Sampling Quality Assurance Project Plan (WHC 1991a).

XI. CHAIN OF CUSTODY PROCEDURES

A Chain-of-Custody form shall be filled out at the time of sampling and will accompany each sample. The *Liquid Effluent Quality Assurance Project Plan* (WHC 1991a) contains a copy of the Chain-of-Custody form to be used. A sample may consist of several containers. The Chain-of-Custody form

will account for each container. Once the sample has been drawn, it must be in the physical control or view of the custodian, locked in an area where it cannot be tampered with, or prepared for shipping with a tamper-proof seal. Physical control will include being in the sight of the custodian, being in a room that will signal an alarm when entered, or locked in a cabinet. When more than one person is involved in sampling, one person shall be designated as sampler and only that person signs for it. This person will be the custodian until the samples are transferred to another location or group and shall sign when releasing the samples to the designated receiver. A private bonded carrier shall be used to transport the samples and Chain-of-Custody document.

The approved laboratory shall designate a sample custodian and a designated alternate responsible for receiving all samples. The sample custodian or his alternate shall sign and date all appropriate receiving documents at the time of receipt and at the same time initiate an internal Chain of Custody form using documented procedures.

The sampling team will fax copies of the Chain-of-Custody form to OSM. The laboratory will return copies of the Chain-of-Custody form to OSM after the samples are received.

XII. DOCUMENTATION CONTROL

Acceptable data will be sent to the Environmental Data Management Center (EDMC) or to the HEIS data file when the data becomes available. State and federal regulators will be notified that the data are available. The data will be part of the administrative record for the Tri-Party Agreement milestones.

The sampling task leader will maintain all sampling and analytical data and field notes as quality records. The sampling team will fax copies of the Sample Analysis Request form, Chain-of-Custody form, and activity screening results to OSM. The original shipping papers will accompany the sample. The laboratory will return copies of the Sample Analysis Request form and Chain-of-Custody form to OSM after it receives the samples. The laboratory will keep the original shipping papers, and OSM will maintain the copies.

REFERENCES

CERCLA, 1980, *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*, as amended, Public Law 96-510, 94 Stat. 2767, 42 USC 9601 et seq.

Ecology, EPA, and DOE, 1989, *Hanford Federal Facility Agreement and Consent Order*, U.S. Environmental Protection Agency, Region 10, U.S. Department of Energy, and Washington State Department of Ecology, Olympia, Washington.

EPA, 1986, *Test Methods for Evaluating Solid Waste*, SW-846, 3rd Edition, U.S. Environmental Protection Agency, Washington, D.C.

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WAC, 1989, *Dangerous Waste Regulations*, Washington Administrative Code 173-303, Washington State Department of Ecology, Olympia, Washington.

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WHC, 1991a, *Liquid Effluent Sampling Quality Assurance Plan*, WHC-SD-WM-QAPP-011, Westinghouse Hanford Company, Richland, Washington.

WHC, 1991b, *Final Report - Decontamination Laundry Facility - Best Available Technology Analysis*, WHC-SD-503-ES-003, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

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New ID Number: WHC-SD-LL-PLN-001 Rev 0

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Review Required per WHC-CM-3-4	Yes	No	Reviewer Name (printed)	Signature	Date
Classification/Unclassified Controlled Nuclear Information	☐	☒	G. J. Carter	G J Carter	1/13/92
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G. J. Carter G J Carter 1/13/92

Responsible Manager (Printed/Signature) Date

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BD-7600-062 (04/90) Part 1

LIST OF FIGURES

METRIC CONVERSION CHART

INTO METRIC		
If you know	Multiply by	To get
Length		
inches	2.54	centimeters
feet	30.48	centimeters
Volume		
gallons	3.786	liters
cubic feet	0.02832	cubic meters
Temperature		
Fahrenheit	Subtract 32 then multiply by 5/9ths	Celsius
Pressure		
inches water	1.87	mm Hg
inches water	249	Paschal (Pa)
OUT OF METRIC		
Length		
centimeters	0.3937	inches
meters	3.28	feet
Volume		
milliliters	1.247×10^{-3}	cubic feet
liters	0.264	gallons
cubic meters	35.31	cubic feet
Temperature		
Celsius	Multiply by 9/5ths, then add 32	Fahrenheit
Pressure		
mm Hg	0.5353	inches water
Paschal (Pa)	4.02×10^{-3}	inches water

2724-W LAUNDRY WASTEWATER SAMPLING AND ANALYSIS PLAN

I. INTRODUCTION

This plan establishes the guidelines for the sampling and analysis of the 2724-W laundry wastewater. It identifies procedures and protocols that provide monitoring until 1995 when the new laundry facility, which will not produce wastewater, is operational. The information obtained will be used to provide evidence of regulatory compliance. All sampling will be performed according to Resource Conservation and Recovery Act of 1976 (RCRA) (RCRA 1976) protocols published in U.S. Environmental Protection Agency EPA SW-846, *Test Methods for the Evaluation of Solid Waste*, "Physical/Chemical Methods," Volume 2, Chapter 9 (EPA 1986). Analysis of the samples will be done according to SW-846 procedures unless otherwise specified.

Quality assurance (QA) objectives for the sampling activities are described in the *Liquid Effluent Sampling Quality Assurance Project Plan* (WHC 1991a).

The 2724-W Sampling and Analysis Plan (SAP) will be edited as necessary to ensure its accuracy and completeness. All changes to this document shall be considered Class III changes to the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 1989). This plan is a supporting document and adheres to Westinghouse Hanford Company Standard Engineering Practices (EP-1.12) (WHC 1990a) for revision and accountability.

II. SAMPLING OBJECTIVES

The objectives of the SAP are to:

- Confirm the data reported in the stream specific report and to ensure the stream does not contain dangerous waste as defined in Washington Administrative Code (WAC) 173-303, "Dangerous Waste Regulations" (WAC 1989)
- Provide confirmatory data to support groundwater contamination migration studies.

III. SITE BACKGROUND

A. 2724-W FACILITY DESCRIPTION

The original laundry building is a wood and concrete structure that was constructed in 1952 and subsequently expanded. The present laundry complex is a series of buildings connected together: 2724-W, 2724-WA, 2724-WB, and

MO-406. This complex covers approximately 25,000 ft^2. The major areas of the laundry complex are the radioactive washing and drying area, nonradioactive washing and drying area, radioactive storage areas, nonradioactive storage areas, folding and monitoring areas, change-rooms, and adjacent lunchrooms and administrative offices. An aerial-view diagram of the laundry facility is shown in Figure 1.

The liquid effluent from the 2724-W Laundry is discharged to the soil column via the 216-W-LC Crib. The 216-W-LC Crib was installed in 1981 along with its associated influent piping. The first wastewater was received in September 1982. A diagram of the crib is shown in Figure 1. The 216-W-LC Crib currently is not regulated under WAC 173-303 (WAC 1989).

All soiled protective work clothing used on the Hanford Site is sent to the laundry for cleaning. The laundry handles approximately 3.3M lb of clothing per year. Approximately two-thirds of this amount is radioactively contaminated clothing. Radioactively contaminated clothing is defined as special protective clothing that has been worn in radiation areas and has the potential of being contaminated. The other one-third is nonradioactive clothing, which includes standard coveralls and bath towels.

All clothing is delivered to the laundry in large canvas bags holding an average of 50 lb, with a range from 30 to 110 lb. These bags are transported by hand either to the radioactive or to the nonradioactive storage area, as appropriate.

Radioactive bags are withdrawn from the storage area and hand loaded into one of the three 600-lb-capacity washing machines. The canvas bags are arranged in the washer to allow the clothing inside to fall from the bags when agitated by the washing action. The complete cycle takes approximately 23 to 42 min, depending on the level of cleaning needed to remove the radiological contamination (i.e., low, medium, or high).

B. STREAM DESCRIPTION

The facility operates on day shift for five days a week with about 10 percent overtime (24 days each month) to meet customer needs. The washers use approximately 200 gal of water for each wash or rinse cycle for about 800 gal per load. The process data sheets report an average of 33 loads each day, which corresponds to the average monthly flow of 691,000 gal, including approximately 200,000 gal/month of steam condensate.

Laundry wastewater is the combination of effluents from many simultaneous activities. During laundry operation, the washing machines are at different points in their respective wash and rinse cycles. The wastestream contributors are: washing machines (5), dryer steam condensate (5), heating, ventilation, and air conditioning systems (HVAC) (2), Roto-clone* hydrostatic precipitator, hot-water-tank heating coils, nonradioactive trench, radioactive trench, and hand-washing sink. (See Figure 2.)

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*Roto-clone is a trademark of Allis-Chalmers, West Allis, Wisconsin.

Figure 1. 2724-W Aerial View of the Laundry Facility.

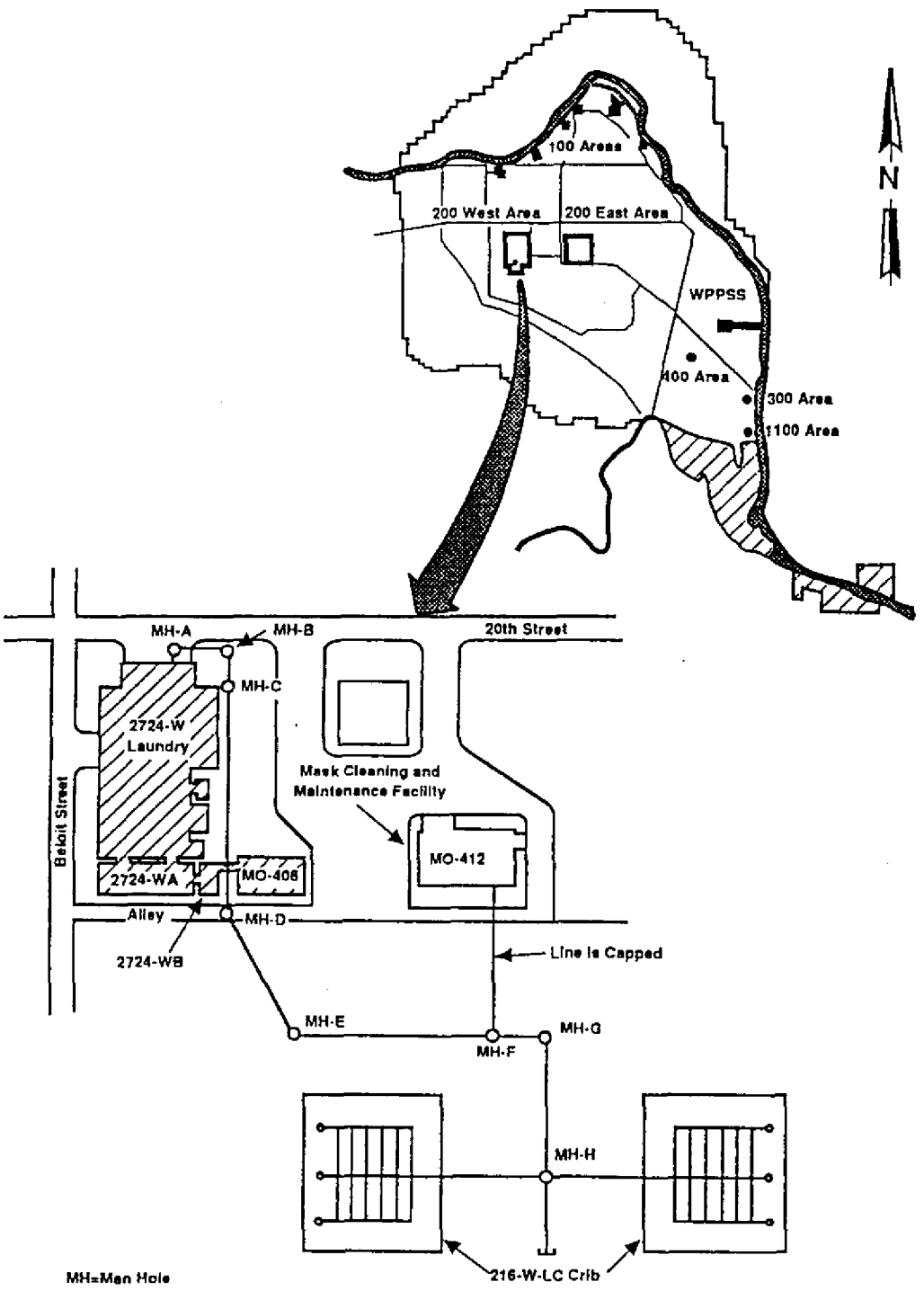
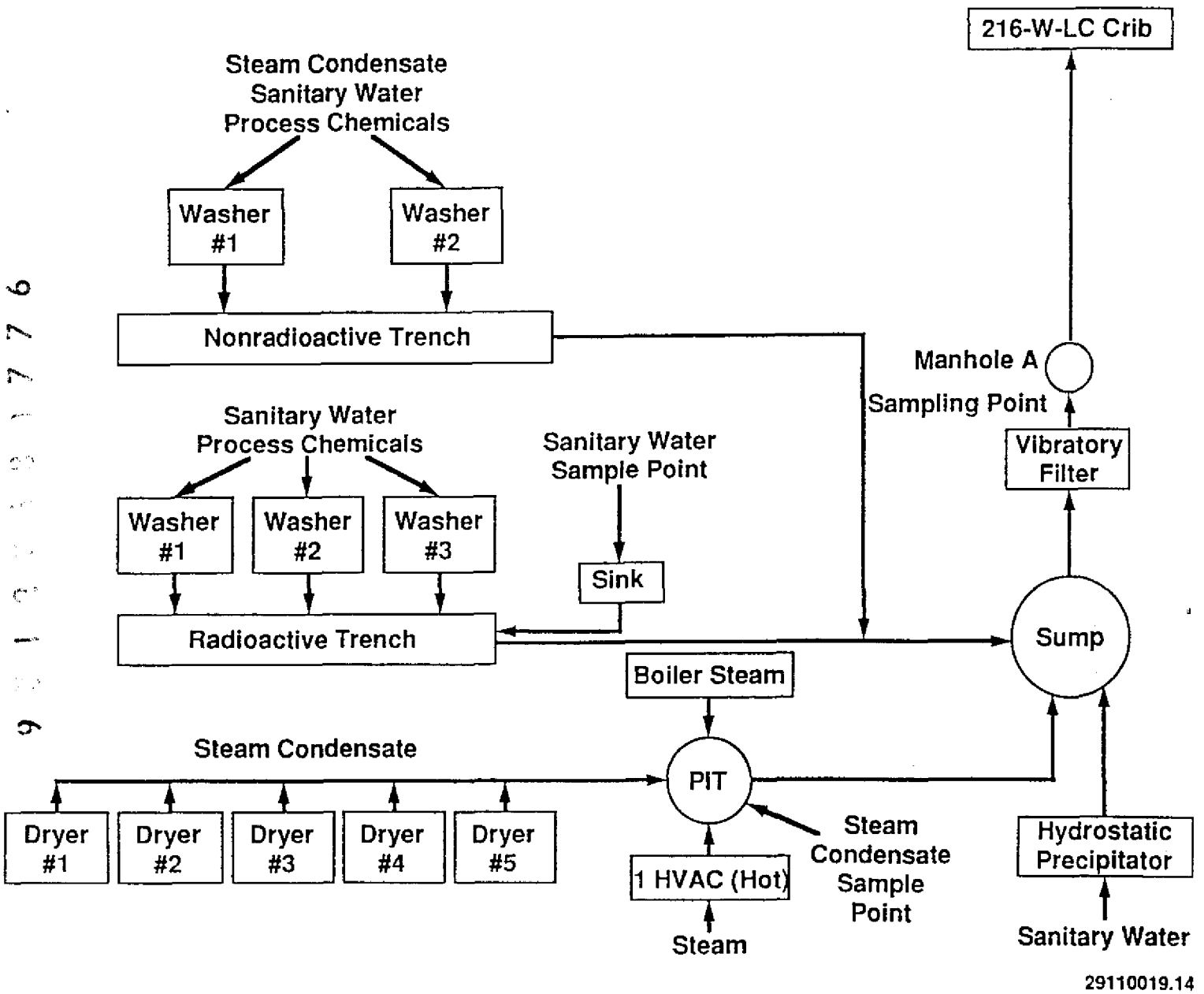


Figure 2. 2724-W Wastewater Contributors.



All of the facility wastewater is collected in a 580-gal building sump before being pumped to the vibratory filter. Currently the effluent leaves the facility through the vibrating filter and gravity flows through eight manholes to the 216-W-LC Crib. An upgrade project to add a pressure precoat filter will be discussed later.

The Roto-clone generates approximately 2,000 gal/day water by scavenging lint from the air exhaust from the three radioactive clothes dryers through hydrostatic precipitation. The steam condensate lines come into the sump from a concrete pit near the Roto-clone. This pit receives steam condensate from the five dryers, the boiler (hot water tank for the washing machines), and the hot side of the HVAC.

The three radioactive washers and two nonradioactive washers are discharged into separate trenches that drain to the sump. The trenches are made of concrete and are part of the floor. The trenches have the following dimensions: radioactive trench--24 in. wide, 12 in. deep, and 75 ft long; and nonradioactive trench--28 in. wide, 12 in. deep, and 50 ft long. The volumes of water used in the different types of washes range from 200 gal to 1,400 gal per load, depending on the wash type. The hand-washing sink discharges into the end of the radioactive trench.

The contributor wastewater volume cannot be measured because the stream does not have a flow meter either at the exit of the facility or at any individual contributors. The total volume contribution has been estimated from influent water meter readings and steam condensate usage. The flow estimates to the crib range from 520,000 gal/month to 951,000 gal/month, with an average of 691,000 gal/month.

The essential chemicals used in the radioactive laundry are 5 to 10 lb of Turco* Aviation and 0 to 5 lb of Turco Decontamination per wash load. The wash cycles range from zero to one prewash cycle, one to two wash cycles, and one to six rinse cycles. The total volume of wastewater generated in a cycle is from 200 to 1,400 gal. On the average, the laundry processes 16 radioactive wash loads per day, with 8 to 10 laundry bags per load.

The nonradioactive laundry uses 0 to 3 lb of Olde Worlde** detergent or 3 to 5 lb of Turco Aviation per wash load of regular laundry. The bath towels receive 0 to 3 lb of Olde Worlde detergent or 3 to 5 lb of Turco Aviation, and 0 to 3 lb of Silver-Wyte*** bleach per load. The washing machines have one wash and two or three rinse cycles. The total volume of water generated on each cycle ranges from 600 to 900 gal. On the average, the laundry processes 12 nonradioactive wash loads per day, with 4 to 13 laundry bags per load.

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*Turco is a trademark of TP Industrial, Inc., Lakewood, California.

**Olde Worlde is a trademark of Olde Worlde Products, North Canton, Ohio.

***Silver-Wyte is a trademark of Fabrilife Chemical Company, Cincinnati, Ohio.